

Software Quality Engineering

Software Quality Engineering A Practitioner's Approach

Witold Suryn

École de Technologie Supérieure
Montréal, Canada

IEEE
 computer
society

 **IEEE**
IEEE PRESS

WILEY

Copyright © 2014 by the Institute of Electrical and Electronics Engineers, Inc. All rights reserved.

Published by John Wiley & Sons, Inc., Hoboken, New Jersey.
Published simultaneously in Canada.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, scanning, or otherwise, except as permitted under Section 107 or 108 of the 1976 United States Copyright Act, without either the prior written permission of the Publisher, or authorization through payment of the appropriate per-copy fee to the Copyright Clearance Center, Inc., 222 Rosewood Drive, Danvers, MA 01923, (978) 750-8400, fax (978) 750-4470, or on the web at www.copyright.com. Requests to the Publisher for permission should be addressed to the Permissions Department, John Wiley & Sons, Inc., 111 River Street, Hoboken, NJ 07030, (201) 748-6011, fax (201) 748-6008, or online at <http://www.wiley.com/go/permissions>.

Limit of Liability/Disclaimer of Warranty: While the publisher and author have used their best efforts in preparing this book, they make no representations or warranties with respect to the accuracy or completeness of the contents of this book and specifically disclaim any implied warranties of merchantability or fitness for a particular purpose. No warranty may be created or extended by sales representatives or written sales materials. The advice and strategies contained herein may not be suitable for your situation. You should consult with a professional where appropriate. Neither the publisher nor author shall be liable for any loss of profit or any other commercial damages, including but not limited to special, incidental, consequential, or other damages.

For general information on our other products and services or for technical support, please contact our Customer Care Department within the United States at (800) 762-2974, outside the United States at (317) 572-3993 or fax (317) 572-4002.

Wiley also publishes its books in a variety of electronic formats. Some content that appears in print may not be available in electronic formats. For more information about Wiley products, visit our web site at www.wiley.com.

Library of Congress Cataloging-in-Publication Data:

Suryn, Witold.

Software quality engineering : a practitioner's approach / Witold Suryn.
pages cm

Includes bibliographical references and index.

ISBN 978-1-118-59249-6 (cloth)

1. Computer software—Quality control. I. Title.

QA76.76.Q35S87 2014

005.1'4—dc23

2013031271

Printed in the United States of America

10 9 8 7 6 5 4 3 2 1

For my daughter, Gabrielle

Contents

Preface	ix
1 Why Software Quality Engineering?	1
2 Software Quality Engineering: Making It Happen	35
3 System and Software Quality Engineering: Some Application Contexts	139
4 Trustworthiness of IT Systems and Services	151
Appendix Cost of Missing Quality: Case Studies	175
Index	191

Preface

When in the early 1980s I began my adventure with information technology, I was enthusiastic, full of ideas, and profoundly naïve. I remember one of my older colleagues at the university saying, “With the microprocessor technology you just dream out what you want to do, and it will be done so.” Since then I have gone through years of using the evolving information technology and every now and then I have had to stop everything I was doing to rescue it. Quite a few times I have lost hours of work, accumulated research data, and patience. . . .

Then I began asking myself the question, “Why is all that happening?” The technology is better and better, machines are more and more powerful, yet still I don’t feel comfortable with keeping my important work in one place and format only. What is missing here?

About twelve years ago I found the answer: the vision for quality of information technology and systems may be there, but it is often not engineered into the products we use.

That was the moment when the idea of this book was born. The purpose of this book is to give a concise, engineering-oriented, and practical support to IT professionals and to those who are responsible for quality of the software or system they develop; those who negotiate new systems to be developed, delivered, and installed; those who will operate and use them; and those who will maintain them. The book is also intended to serve in academia as a manual to lectures that address the subject of software or system quality.

Software and system quality engineering is discussed in this book from four different perspectives: why it is important (Chapter 1), how to make it happen (Chapter 2), application contexts (Chapter 3), and what could be done to increase trust in contemporary software and systems (Chapter 4). Every chapter offers both a layer of theoretical introduction required to correctly grasp its content and a practical part that offers hands-on recommendations.

The effective use of this book depends on the reader’s level of familiarity with the subject of software and systems quality. For the readers who possess practical knowledge of software and systems quality-related standards (ISO, IEEE), a considerable part of theoretical introduction may be deemed unnecessary. For the beginners or those who want to reorient their practices toward disciplined, standards-based approaches to engineering quality into software or a system, following the path of theory to practice is recommended. Finally, the practitioners who feel very comfortable with quality engineering matter may even go directly to Chapter 2, as it offers a lot of support in terms of practical identification, definition, and execution of engineering “to-dos” required in the process of developing a system or software that possesses both functionalities *and* quality.

Witold Suryn